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CONSPECIFIC ODORS TO IMPROVE NORTHERN POCKET GOPHER CAPTURE SUCCESS

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CONSPECIFIC ODORS TO IMPROVE NORTHERN POCKET GOPHER CAPTURE SUCCESS

by

GILBERT PROULX, Ph.D., R.P.Bio.

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ALPHA WILDLIFE RESEARCH & MANAGEMENT LTD.

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229 Lilac Terrace, Sherwood Park, Alberta, Canada T8H 1W3
Tel: (780) 464-5228 • Fax: (780) 417-0255
e-mail: alphwild@telusplanet.net
www.alphawildlife.ca

EXECUTIVE SUMMARY

Trapping is the only method that effectively controls northern pocket gopher (*Thomomys talpoides*) populations. However, it is time-consuming and labor-intensive. This study aimed to assess the ability of female scents to improve the trappability of pocket gophers during the reproduction season.

The study was carried out from 18 Aparil to 25 May 2001 in Sherwood Park, Alberta. Tests involving two groups of traps were used. In one group, female-scented pads were placed behind the trap trigger. In the other group, non-scented pads were used. The impact of female scents on the capture success was monitored after each trapping sesssion using the ratio of *captures in scented traps* to *captures in unscented traps*.

During three trapping sessions carried out from 27 April to 10 May (48 trapnights [TN]), there was no significant difference ($P > 0.05$) between the number of captures in scented (18 pocket gophers or 0.38 animals/TN) and unscented (23 or 0.48/TN) traps. From 15 May to 24 May (82 TN), scented traps continuously outperformed unscented ones. There was a significantly greater ($P < 0.025$) number of captures in scented traps (45 animals or 0.55/TN) than in unscented ones (25 animals or 0.30/TN). From the 27 April-10 May period to the 15-24 May period, the overall number of captures/TN increased by 45% in scented traps, but decreased by 38% in unscented traps. The sex ratio of captured populations was even.

This study showed that female scents attract pocket gophers and render trapping more efficient during the late part of the reproduction season. It is recommended that this work be repeated next year. Efficient female scents should be analyzed for specific components, e.g., hormones, that should be field-tested and possibly marketed.

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BACKGROUND

Trapping is the only method that effectively controls northern pocket gopher (*Thomomys talpoides*) populations (Proulx 1997, 1998). Proulx (1997) recommended that trapping be carried out in spring, and completed before June, in order to remove breeders and eliminate the expansion of pocket gopher populations over summer. However, trapping is time-consuming and labor-intensive, and the use of an attractant would be useful to quickly remove breeders of the year.

Pheromones are groups of biologically active substances that are secreted to the outside by an individual, and received by another individual in which they trigger a specific reaction (Birch 1974). Although the specific functions of such chemical communication are not well understood, pheromones may play a role in activities such as foraging, territory maintenance, and reproduction (see Pawlina and Proulx 1999). Proulx and Cole (1996) found that northern pocket gophers reacted to the presence of conspecific odors during the reproduction season. A significantly greater number of animals were captured in adult female-scented traps than in male- and juvenile-scented traps, and unscented traps. However, Proulx and Cole's (1996) work was conducted during one growing season only.

OBJECTIVE

The objective of this study was to assess the ability of female odors to improve the trappability of northern pocket gophers during the reproduction season.

STUDY AREA & METHODS

The study was carried out from 18 April to 25 May 2001 in Sherwood Park, Alberta. One male and 3 female gophers were live-trapped, and placed individually in 66 x 34 x 37 cm cages in a shed. The animals were subjected to a normal day-night cycle, and fed a daily ration of vegetables and alfalfa (*Medicago* spp.) roots. Knowing that male scent may incite females to produce sexual pheromones (see Pawlina and Proulx 1999), a male was kept in proximity to females. However, male pheromones are not as effective as female ones to attract pocket gophers into traps (Proulx and Cole 1996) and, for this reason, male scents were not collected. The bottom of the cages of the females was lined with absorbing pads. Urine, feces, and feeding material were in contact with the pads for at least 48 hours. Scented pads were used immediately after removal from the cages.

Scented pads were evaluated in alfalfa fields with killing box traps from 27 April to 25 May. During each of the 27 April and 2 May tests, only 1 dozen traps with scented pads and 1 dozen traps with unscented pads were used. During this time of year, it was difficult to live-capture female pocket gophers, and tests were carried out with pads scented by one pregnant female only. The limited amount of scented pads explains the smaller number of traps used during each test. In all subsequent tests, tests involved two groups of at least 16 traps with scented (from 2 pregnant and 1 non-pregnant females) and unscented pads. The scenting of traps was done by placing a 3x 6 cm piece of scented pad behind the trap trigger, on the floor of the pocket gopher's tunnel. In control traps, a piece of clean pad was used. Traps were set early in the morning, and visited and

removed the following morning. Traps were therefore set for 1 trapnight (TN) only. The sex of the captured animals was determined in the field. When no capture occurred, information on the state of the trap (i.e., plugged, disturbed, etc.) was recorded. Traps were thoroughly washed between test series.

Scents impact on the trappability of pocket gophers only during a short period of the reproduction season (Proulx and Cole 1996). In this study, this impact was monitored after each trapping session using the ratio of *captures in scented traps* to *captures in unscented traps*. A ratio of 1 was obtained when an equal number of captures was recorded in scented and unscented traps. When the ratio < 1, the scented traps captured less animals than the unscented ones. A ratio > 1 indicated that scented traps were more efficient than unscented ones, and therefore had a positive impact on capture success. Chi-square statistics (Siegel 1956) were used to analyze trapping results and determine whether there were any differential responses of pocket gophers to scented and unscented traps.

RESULTS

During three trapping series carried out from 27 April to 10 May, scented traps failed to outperform unscented traps (Fig. 1). Altogether, these trapping series amounted to 48 TN, with 18 pocket gophers captured in scented traps (0.38 animals/TN) and 23 in unscented traps (0.48/TN) (Table 1). There was no significant difference ($\chi^2 = 0.39$, df:1, $P > 0.05$) between the number of captures in scented and unscented traps. Also, both populations had an even sex ratio ($\chi^2 \leq 2.78$, df:1, $P > 0.05$). A total of 8 unscented traps were found plugged compared to 2 scented ones (Table 1).

From 15 May to 24 May, scented traps continuously outperformed unscented ones (Fig. 1). After 82 TN, there was a significantly greater ($\chi^2 = 5.15$, df:1, $P < 0.025$) number of captures in scented traps (45 animals or 0.55/TN) than in unscented ones (25 animals or 0.30/TN) (Table 1). The sex ratio of both populations was even ($\chi^2 < 2.56$, df:1, $P > 0.05$). A total of 5 traps were plugged in each group (Table 1).

From the 27 April-10 May period to the 15-24 May period, the overall number of captures/TN increased by 45% in scented traps, but decreased by 38% in unscented traps.

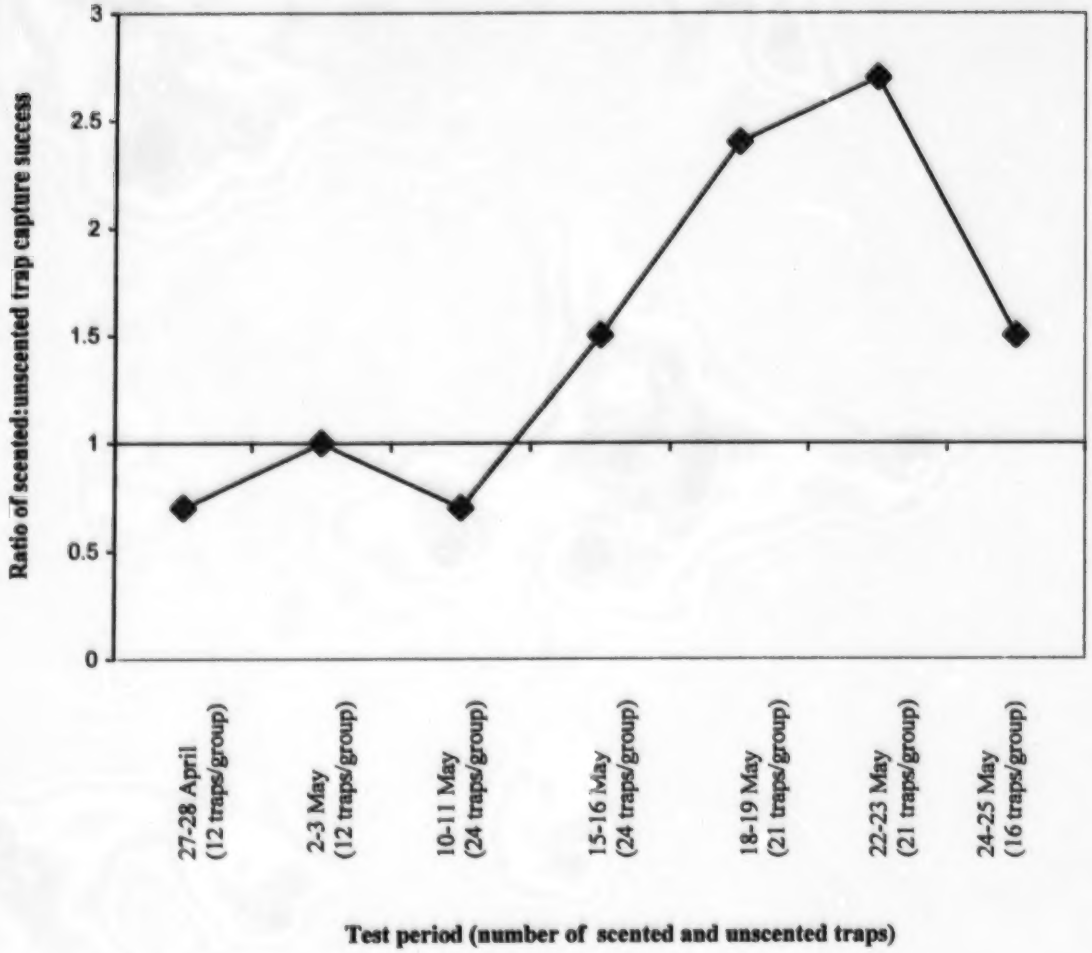

Figure 1. Ratio of *captures of pocket gophers in scented traps* to *captures in unscented traps*, 27 April to 25 May, 2001 Sherwood Park, Alberta.

Table 1. Captures of northern pocket gophers in scented and unscented killing traps, 27 April-25 May, 2001 Sherwood Park, Alberta.

Date	Number of traps/group	Captures						Ratio scented:unscented traps
		Scented traps			Unscented traps			
		Male	Female	Plugged traps	Male	Female	Plugged traps	
27 April	12	1	4	0	6	1	2	0.7
2 May	12	3	2	1	3	2	3	1.0
10 May	24	5	3	1	6	5	3	0.7
Total	**48**	**9**	**9**	**2**	**15**	**8**	**8**	**0.8**
15 May	24	12	4	4	8	3	2	1.5
18 May	21	7	5	0	3	2	1	2.4
22 May	21	4	4	1	3	0	1	2.7
24 May	16	4	5	0	3	3	1	1.5
Total	**82**	**27**	**18**	**5**	**17**	**8**	**5**	**1.8**

DISCUSSION

Rowe (1970) was among the first to suggest that susceptibility of rodents to being trapped might be influenced by trap odors, noting that wild male house mice (*Mus musculus*) were caught more often in traps marked with odors of conspecific than in clean, unmarked traps. An increase of capture success due to conspecific scents was also reported for voles (Boonstra and Krebs 1976, Stoddart 1982, Heske 1987), cotton rats (*Sigmodon hispidus*) (Summerlin and Wolfe 1973), California ground squirrels (*Spermophilus beecheyi*) (Salmon and Marsh 1989), and other rodents (Ritter et al. 1982, Stoddart and Smith 1986).

In this study, increased capture success was due to pocket gopher female scents. This finding ascertains Proulx and Cole's (1996) conclusion that female scents attract pocket gophers and render trapping more efficient during the reproduction season. Proulx and Cole (1996) found that scented traps removed a significantly greater number of females than males. In this study, the sex ratio of the captured population was even.

The pocket gopher reproduction season lasts from mid-April to late May (Proulx 2001). This study showed that the influence of female scents on the trappability of pocket gophers occurs towards the end of the reproduction season, i.e., after 10 May. Proulx and Cole (1996) also reported that scented traps became more efficient starting 10 May. This difference in the response of animals to scented traps from the beginning to the end of the reproduction season is not easily explained. During the first weeks of the reproduction season, most females are pregnant and may not yet be concerned with the safety of their young. In mid-May, however, most females have given birth (Proulx 2001), and their maternal protection instinct may result in a thorough investigation of scented traps, and a greater number of captures. Since most females produce only one litter per year, males' breeding activities have likely decreased by mid-May (Proulx 2001). Males that are still sexually active may be eager to find the origin of an invasive female scent, and readily enter scented traps. It is also possible that towards the end of the reproduction season, territorial males become more aggressive and readily enter scented traps to eliminate an intruder. Detailed behavioral work on pocket gophers' territoriality and response to conspecifics will be required to explain differences in the attraction of female scents from the beginning to the end of the reproduction season.

RECOMMENDATIONS

This study showed that northern pocket gophers reacted to the presence of female scents during the reproduction season, thus resulting in increased trapping success. In light of this result, it is recommended that this work be repeated next year and, upon a significant increase in the trappability of pocket gophers, female scents be analyzed for specific components, e.g., hormones. Such components should then be field-tested to determine if they have an impact similar to that of female scents. The identification of a component that can be commercially produced and distributed would significantly improve pocket gopher control programs.

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